

Effect of Educational Guideline on mothers' Knowledge and Practice regarding neonates and Young Children with Brachial Plexus Injuries

Sahar SedkyFaheim¹, SamahAbdalha Mohamed Amer²

¹Lecturer of Pediatric Nursing, Faculty of Nursing, Beni-Suef University, Egypt

²Lecturer of Pediatric Nursing, Faculty of Nursing, Benha University, Egypt

Corresponding Author: Sahar SedkyFaheim

Abstract: Background: Brachial plexus injury (BPI) is a relatively recurrent state leading to a complex functional damage of the upper limb and disability. BPI evaluation and treatment have developed over the past few decades.

Aim:To evaluate effect of educational guidelines program on mothers' knowledge and practice regarding neonates and young children with brachial plexus injuries

Design:A quasi-experimental design was utilized.

Setting:The study was conducted at Outpatient Clinic of Benha Specialized Pediatric Hospital.

Sample: A purposive sample of 100mothers and their neonates and young childrenfrom the previously mentioned setting. The following study **tools** were used (pre/posttests): 1) A Self-administered questionnaire to assess their knowledge as regards brachial plexus injuries. 2) An observational checklist to evaluate studied mothers' practices such as sensory stimulation with warm, splint or elbow restraining, stretching exercise with music and skin care during splint.

Results:The mothers' age ranged between 25 < 30 years with mean age 28.68±4.33 and 40%of them had Secondary & technical institute degree. There was a highly statistically significant difference ($P<.0001$), regarding their knowledge, attitudes and practices before, immediately after, and at follow up guideline implementation toward neonates and young children with brachial plexus injuries

Conclusion: The present study concluded that, the educational guideline had a positive effect on mothers' knowledge and practice regarding neonates and young children with brachial plexus injuries.

Recommendations: Provide continuous education, training and early intervention to avoid further complication and handicaps. Further studies should be carried out on a large number of such groups of studies for evidence of the results and generalization.

Keywords: Brachial plexus injuries, Educational guidelines, Mothers 'knowledge and practice, Neonates, Young children

Date of Submission: 12-08-2019

Date of Acceptance: 26-08-2019

I. Introduction

The neonatal brachial plexus is a large network of nerves that outspread from the neck into the arm. The network is composed of the nerves that transmit signals from the spinal cord to the shoulder, arm, hand, and fingers. These signals transmit data between the brain, the spinal cord, the arm and hand and are required for characteristic movement and sensation.(Coroneo et al., 2016). The function of these nerves is providing movement and sensation to the arm and hand. It is through the nerves of the brachial plexus that the brain sends electrical signals to the newborn children muscles of the arm and hand(Abdullah et al. 2014).

Neonatal brachial plexus palsy (injures) (NBPP) is the partial or total paralysis of the upper extremity due to trauma of nerves of the brachial plexus during childbirth (Akel et al., 2013).

Brachial plexus injury (BPI) is an injury in neonates, supposed to be sustained during labor and delivery.NBPP happens in 0.38 to 2.6 per 1,000 live births in the United States. Occurrence is appraised to be between 1.6 and 2.6 in 1000 births,equal to autismand congenital deafness.It is more than for type 1 diabetes mellitusand cystic fibrosis (Coroneo et al., 2016).If injury nerves in the upper part of the brachial plexus network, the injury is called Erb's (or Erb-Duchenne) Palsy. If the nerves in the lower part of the brachial plexus are injured, the injury is called Klumpke's (or Dejerine-Klumpke) Palsy. In some instances, all the nerves may be damaged, resulting in "global" palsy, however types of NBPI are an avulsion, a rupture, a neuroma, axonotomesis and neuropraxis(Myrold and Wagner 2015).

The causes of injury has been reported that NBPP occur as result poor handling of the new born during or after delivery for example(e.g.) extreme pulling on the shoulders during delivery or pulling infant's head and neck toward the side at the same time as the shoulders pass through the birth canal (**Ming,et al., 2012**). (BPI) is a relatively frequent disorder leading to a complex functional impairment of the upper limb and disability, it is caused mostly by traumatic accidents resulting principally in traction forces, a wound or a compression of the plexus on the hard surface of the neighboring structures (ribs, vertebral bodies or muscles). Sometimes it can be produced by tumors, inflammatory diseases or by diagnostic or therapeutic procedures. If it happens during birth it is defined obstetric brachial plexus palsy (OBPP) (**Smania et al., 2012**).

Approximately 54% of neonatal brachial plexus injuries do not have a known cause (**Myrold and Wagner 2015**). Risk factors in Brachial plexus injury include fetal factors, maternal factors and factors related to labor. The most common fetal risk factor is macrosomia, perinatal dysphyxia, prolonged labor, use of forceps or vacuum, fetus presentation, and breech delivery (**Pondaag et al., 2011 and Myrold and Wagner 2015**). Maternal risk factors e.g. maternal size, multiparity, having a history of a previous child with NBPI, and maternal pelvic abnormalities and presence of gestational diabetes mellitus factors and risk factors related to the labor process comprises shoulder dystonia, induction of labor, prolonged second stage of labor, mode of delivery and helped vaginal delivery (**Abuaraba et al., 2016**).

Manifestations can range from mild injuries with complete resolution to severe and permanent disability (**Raducha et al., 2017**). The individual signs and symptoms of NBPI vary depending on the severity of the injury and the injury site. The newborn may experience imperfect range of motion, pain, loss of sensation, weakness, and complicated to abnormal muscle contractions and permanent, partial to complete paralysis of the arm and hand (**Harrison, 2009**). These limitations may consequence in difficulties with the achievement of developing milestones, such as holding a bottle, using both hands to play with a toy, crawling, and pulling self-up to standing (**Akel et al., 2013**).

The pediatric nurse role in educational guideline for mothers' neonatal brachial plexus injuries is very important and critical role to raise their knowledge, and practices regarding to caring and increasing recovery rate of brachial plexus injuries in the orientation program and the in-service reminder training. Also, it ensures that, the caregiver personnel, who are involved in application of home program or care, are trained and competent to perform the procedure with perfect technique that leads to proper care of neonatal brachial plexus injuries and increasing recovery rate and thus preventing the occurrence of complications because of overall, patients have a high rate of spontaneous recovery (66–92%) (**Myrold and Wagner 2015**). Initially, all lesions are managed with passive range motion or passive range of motion Stretching exercise with music and observation, massage with warm water and handing support (sensory stimulation). Prevention and/or correction of contractures with occupational therapy, serial splinting/casting or elbow restraining positioning and repositioning and play activities and feeding methods and skin care during splint along with encouraging normal development are the core goals of non-operative management. Surgical involvement may be warranted, depending on functional recovery (**Raducha et al., 2017**).

Significance of the study

Due to the potential functional difficulties and partial or complete paralysis neonates and young children with BPI, because of the majority of NBPI who are treated without surgery, the gradual and variable return of function is tempered by a simultaneous process of remaining deformity at the bony, muscular, and soft-tissue level and the newborn need to long-term follow-up (>3 years). Therefore, the treatment program must occur early. Evidence has shown 92% of spontaneous recovery occurs during the first three months of life. Initially, all lesions are managed with passive range motion and observation (**Memo, et al., 2013 and Raducha et al., 2017**).

Moreover, exploring mothers' knowledge and identifying their practices regarding NBPI in order to determine the gaps, defects and work necessary to overcome the defects by constructing and applying a well-designed instructional program based on the identified needs and observations to enrich mothers' knowledge and improve their practices regarding NBPI. The improvement of mothers' knowledge and practices regarding neonates and young children with NBPI will directly or indirectly lead to increase rate of recovery and reduce the complications related to NBPI.

The nurse can be supporter for mother with NBPI, meeting their needs by designing programs to improve their knowledge and practice or even confining in teaching classes focusing on the targeted areas of massage with warm water and handing support (sensory stimulation), splint or elbow restraining positioning and repositioning, passive range of motion Stretching exercise with music, active range of motion Stretching exercise with music, play activities and feeding methods and skin care during splint, injury prevention and health protection of their neonates from hazards (**Myrold and Wagner 2015**). Therefore, the current study aimed to evaluate effect of educational guidelines program on knowledge and practice for mothers' neonates and young children with brachial plexus injuries.

II. Aim of the study

To evaluate effect of educational guidelines program on mothers' knowledge and practice regarding neonates and young children with brachial plexus injuries

Research Hypothesis:

- The mothers' knowledge will be significantly improved after implementing the brachial plexus injuries educational guidelines in neonates and young children, compared to their pre-knowledge level.
- The mothers' practice will be significantly enhanced after implementing the brachial plexus injuries educational guidelines in neonates and young children, compared to their pre-practice level.

II. Subjects and Methods

Research design: -

A quasi-experimental design was used in order to achieve the aim of the study. This design used to compare participant groups and measure the degree of change occurring as a result of treatments or interventions.

Setting:

The present study was conducted at Outpatient Clinic of Benha Specialized Pediatric Hospital.

Subjects:

All available mothers and their neonates and young children with brachial plexus injuries attended at previous setting, (100) mothers are willing to participate in the study and didn't attend any program about brachial plexus injuries in neonates and young children.

III. Study Tools

Two tools were used in this study for data collection:

First tool: A Self-administered questionnaire: Developed by the researchers after reviewing of related literature (Abdullah (2014), Iffy (2015), & (Myrold, M., and Wagner, T., 2015) it was used to assess the following parts:

Part (A): Characteristics of neonates and young children, such as; age, sex, mode of delivery and birth weight.

Part (B): Characteristics of mothers, such as; age, educational qualification, residence and occupation status.

Part (C): It was used to assess mothers' knowledge regarding brachial plexus injuries in infant and young children pre, post, and follow up guideline implementation. It assesses main concepts in brachial plexus injuries, which included 12 open-ended questions regarding definition of brachial plexus (1 question), function of brachial plexus (1 question), definition of brachial plexus injuries (1 question), types (1 question), causes (1 question), clinical manifestation (1 question), diagnostic tests (1 question), surgical and medical treatment (2 question), preventing methods (1 question), complications (1 question) and nursing care (1 question).

This questionnaire distributed in the same form three times (pre, post-program implementation, and at one month's follow up) for the same group of nurses. The questionnaire Alpha Cronbach reliability test equal 0.84.

Scoring system: Knowledge content was divided into 12 questions and each question was assigned to three score levels: Complete and/or correct answer was scored (3), while incomplete correct answer was scored (2), and don't know or wrong answer was scored (1). The total score was categorized into either satisfactory level (from 70% and more) or unsatisfactory level (less than 70%) from total score (36).

II- An observational checklist (pre/post and follow up tests). Adopted from; Williams, (2005), Myrold and Wagner (2015), Meghan & Wayne (2016), it was filled in by helping the researchers to evaluate mothers' practices in relation to NBPI as massage with warm water and handing support (sensory stimulation), splint or elbow restraining positioning and repositioning, passive range of motion Stretching exercise with music, active range of motion Stretching exercise with music, play activities and feeding methods and skin care during splint.

Scoring system: Each step was assigned to two score levels, which are: done was scored (2), and not done scored (1). The total score was categorized into either competent (from 70% and more) or incompetent (less than 70%) from total score as the following: Massage with warm water and handing support (sensory stimulation) (7 steps) and total score = 14; Splint or Elbow restraining positioning and repositioning (7 steps) and total score = 14, passive and active stretching exercise with music (15 steps) and total score = 30, play and feeding activities (13 steps) and total score = 26; and skin care during splint (14 steps) and total score = 28. The checklist's Alpha Cronbach reliability test equal 0.86. The practice total score equal 112

Validity and reliability of study tools:

Content validity was ascertained by a group of experts (5) including 3 Pediatric Nursing, 2 Physiotherapy. Their opinions were stimulated regarding to the tools format layout, consistency, scoring system. The tools content was verified regarding to the knowledge accuracy, relevance and competence. Reliability of all items of the tools were done. The reliability test of was established by using the Cronbach alpha to assess internal consistency construct validity. Cronbach alpha $r = 0.86$ and 0.84 .

Administrative design:

An official approval was obtained from the administrators of the study settings to carry out the study. A clear explanation was given about the aim, nature, importance and expected outcomes of the study.

Pilot study:

A pilot study was conducted on 10% of the total study subjects (10 mothers) to test the clarity and practicability of the tools, and suitability of the setting. The pilot study sample is then excluded from the main study sample as there were no modifications on the tools.

Ethical considerations:

Approval to conduct the study was obtained from the director of the previous selected setting. All mothers who agreed to participate and meet the inclusion criteria were informed about the study aim and their rights according to research ethics to participate or not in the study. Then, they gave their consent to participate in the study.

Field work:

After official permissions to carry out the study, were gained the aim of the study was clarified to the subjects in each study setting. The study was carried out over a period of 12 months from beginning of May 2017 to end of April 2018. The average time spent to fill in the tools was 30 minutes for the self-administered questionnaire. The previously mentioned settings were visited by the researchers 2 days/week (Mondays & Tuesdays) from 9.00 a.m. to 2.00 p.m.

Educational guideline phases:

This program was conducted on five consecutive phases, assessing, developing, implementing, evaluating, and follow-up

Assessment phase:

A pre-educational guideline assessment was performed using the self-administered questionnaire for data gathering from the previously stated settings. This phase aimed at assessing mothers' knowledge and practice regarding neonates and young children with brachial plexus injuries

Preparations program:

- An educational guideline was developed based on actual mothers' need assessment about brachial plexus injuries in neonates and young children.
- Content of the guidelines was written in simple Arabic language by the researchers, consistent with the related literatures and mothers' level of understanding.
- The guidelines were presented in theoretical and practical sessions. Subjects were divided into small groups (5 – 6) mothers and repeated sessions included all mothers. Each group attended 4 sessions (2 theories and 2 practices). Moreover, each mother was guided by simple instructions and then orientation about the aim, contents and expected outcomes was done.

Firstly: The theoretical sessions were taken in 2 sessions (each session for 30 minutes) and cover the following items: definition of brachial plexus, function of brachial plexus, definition brachial plexus injuries, types, causes, clinical manifestation, diagnostic tests, surgical and medical treatment, preventing methods, complications and nursing care of brachial plexus injuries in infant and young children.

Secondly: Sessions were conducted in the form of lectures/discussions, followed by the practical part which consisted of two sessions (each session for 30 minutes) and covers the following items: massage with warm water and handing support (sensory stimulation), splint or Elbow restraining positioning and repositioning, passive range of motion Stretching exercise with music, active range of motion Stretching exercise with music, play activities and feeding methods and skin care during splint in the form of demonstration and redemonstration using role play, simulator, real objects, discussions and brainstorming. The researchers used effective media of

conveying information as, power point presentations and posters. A guideline handout was developed and offered for mothers as a reference to be used after guideline implementation.

Program construction:

- Content of the guidelines was written in simple Arabic language by the researchers, consistent with the related literatures and mothers' level of understanding.
- The guidelines were presented in theoretical and practical sessions. Subjects were divided into small groups (5 – 6) mothers and repeated sessions included all mothers. Each group attended 4 sessions (2 theories and 2 practices). Moreover, each mother was guided by simple instructions and then orientation about the aim, contents and expected outcomes was done.
- Mothers were informed to be in contact with the researchers by telephone for any guidance.
- Evaluation for the effect of guidelines on the studied mothers using the pre-constructed tools as follows:
- Posttest was done after application of the guidelines.
- Follow up test after two months later by using the same tools

Implementation of the program:

Implementation of the educational guideline was conducted at the previously stated settings. At the beginning of the first session, an orientation of the educational guideline and its purpose was presented. Mothers were divided into groups, and each group involved of 9-10 nurses approximately. Each session started with a summary about what had been given through the previous sessions and the objectives of the new topic, taking into consideration the use of simple language to suit the level of mothers' educations. As well, the session ended by a summary of its content and a feedback gained from others.

The educational guideline was carried out through five sessions, the time of each session ranged between 30 - 45 minutes according to the mothers` needs and condition of the group. The theoretical part of the strategic guideline was presented in three sessions in the form of lectures/discussions, followed by the practical part which consisted of two sessions in the form of demonstration and redemonstration using role play, simulator, real objects, discussions and brainstorming. The researchers used effective media of conveying information as, power point presentations and posters. A guideline handout was developed and offered for mothers as a reference to be used after guideline implementation.

Evaluation phase:

The evaluation phase was done immediately post implementation of the educational guideline and at follow up one month later by comparing changes in mothers' knowledge and practices regarding educational guideline for neonates and young children with brachial plexus injuries

Statistical Design:

The data collected were organized, sorted, tabulated and analyzed using the Statistical Package for Social Sciences (SPSS). They were presented in tables and charts using numbers, percentages, means, standard deviations, t-test and Chi-square (X^2) test. Level of significance was considered $p < 0.0001$.

IV. Results

Table (1) Characteristics of the Studied Neonates and Young children with Brachial Plexus Injuries (n=100)

Socio-demographic characteristics	No	%
Age/years		
< 1	22	22.0
1-3	55	55.0
3<6	21	21.0
≥ 6	2	2.0
Mean ±SD	2.88±1.66	
Sex		
Male	43	43.0
Female	57	57.0
Mode of delivery		
Normal	87	87.0
Caesarean	13	13.0
Birth weight		
<1500	27	27.0
1500-2500	7	7.0
2500-3500	2	2.0
≥3500	64	64.0

Table (1) shows that 55% of the studied neonates and young children their age ranged between 1-3 years with a mean age of 2.88 ± 1.66 years. Concerning their sex, 57% of them were females. As regards mode of delivery, 87% of them were normal delivery. In relation to neonates' birth weight 64% and 27% of them were ≥ 3500 and < 1500 respectively.

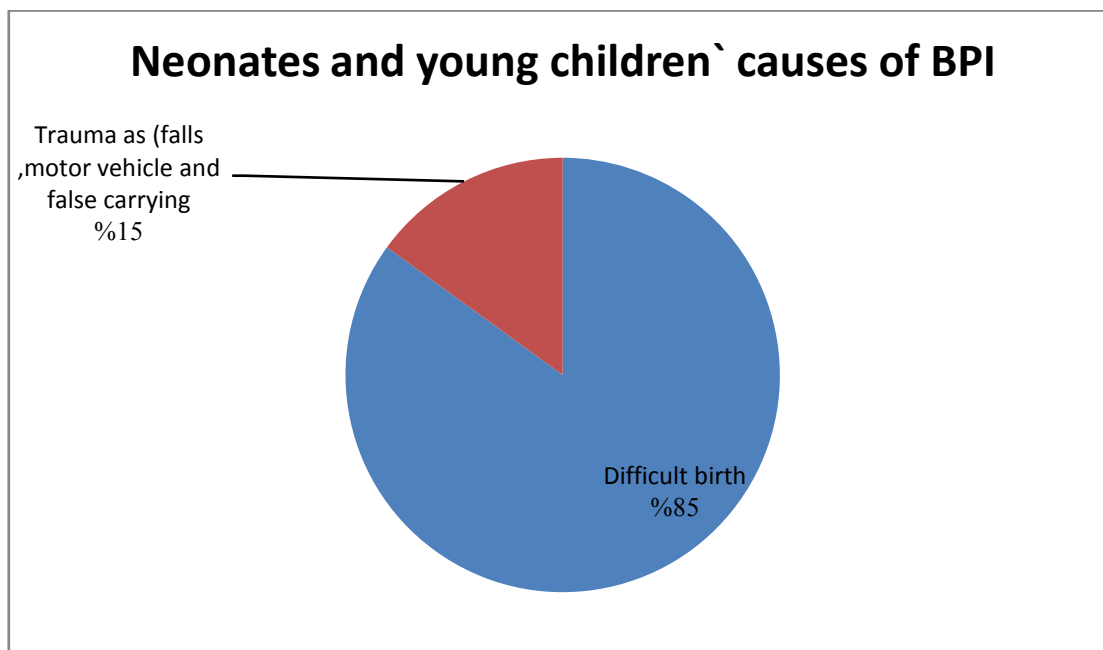


Fig (1) Distribution of Neonates and Young Children Regarding Causes of Brachial Plexus Injuries
Figure (1) illustrates that the causes of brachial plexus injuries in neonates and young children were difficult birth (85%), followed by trauma as (falls, motor vehicle and false carrying (15%).

Table (2) Characteristics of the Studied Mothers of Neonates and Young children with Brachial Plexus Injuries (n=100)

Socio-demographic characteristics	No	%
Age/years		
< 20	10	10.0
20 < 25	25	25.0
25 < 30	35	35.0
≥ 30	30	30.0
Mean \pm SD	28.68\pm4.33	
Educational level		
Illiterate & primary	36	36.0
Secondary & technical institute	40	40.0
High	24	24.0
Residence		
Urban	32	32.0
Rural	68	68.0
Mothers' occupation		
Working	46	46.0
House wives	54	54.0

Table (2) shows the socio demographic characteristics of the studied mothers. It indicates that, their age ranged between 25 < 30 years with mean age 28.68 ± 4.33 years. Regarding the level of education, less than half (40%) of the mothers had Secondary & technical institute degree. As regards residence of mothers, this table showed that 68% of them from rural community. While according to mother's occupation 54% of mothers weren't working.

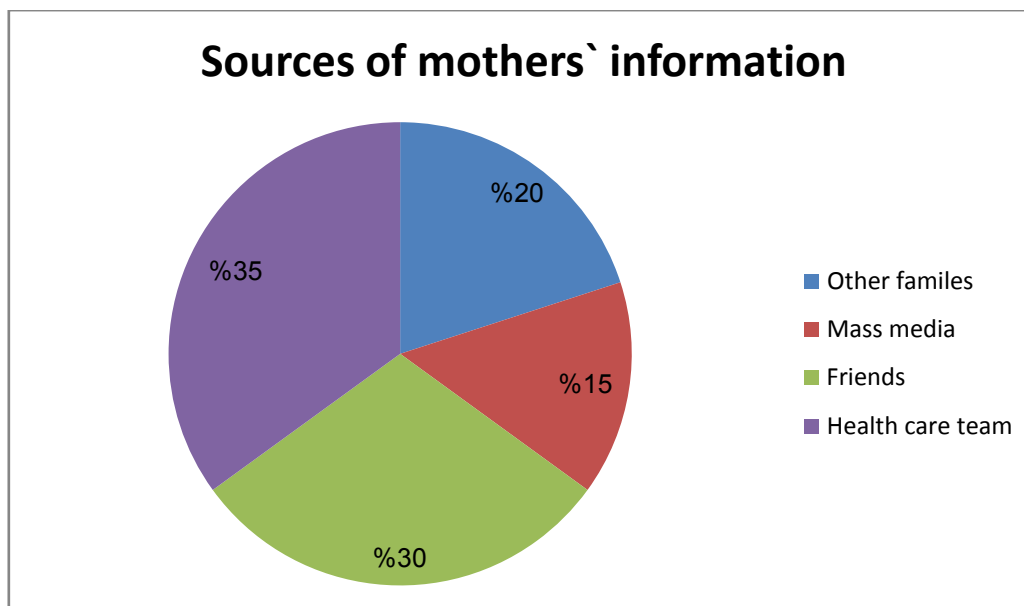


Fig (2) Distribution of Mothers Regarding the Source of Information about Brachial Plexus Injuries Neonates and Young Children

Figure (2) illustrates that the sources of information for mothers were health care team (35%), followed by friends (30%), then other families (20%), and the least mass media (15%).

Table (3) Percentage Distribution of the Studied Sample of mothers According to their Knowledge about Brachial Plexus Injuries of their Neonates and Young Children throughout the Guideline Phases (n = 100).

Knowledge related to Brachial Plexus Injuries	Pre- guideline		Post- guideline		Follow up	
	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory
	%	%	%	%	%	%
Definition of brachial plexus	5.0	95.0	88.0	12.0	85.0	15.0
Function of brachial plexus	3.0	97.0	95.0	5.0	92.0	8.0
Definition of brachial plexus injuries	40.0	60.0	95.0	5.0	92.0	8.0
Types	37.0	63.0	96.0	4.0	95.0	5.0
Causes	5.0	95.0	88.0	12.0	85.0	15.0
Clinical manifestation	35.0	65.0	88.0	12.0	85.0	15.0
diagnostic tests	5.0	95.0	88.0	12.0	85.0	15.0
Surgical treatment	10.0	90.0	90.0	10.0	85.0	15.0
Medical treatment	40.0	60.0	90.0	10.0	90.0	10.0
Preventing methods	4.0	96.0	95.0	5.0	90.0	10.0
Complications	20.0	80.0	90.0	10.0	88.0	12.0
Nursing care	30.0	70.0	95.0	5.0	92.0	8.0
T-test P value	$X^2 = 18.8$ pre- guideline versus post- guideline $X^2 = 22.5$ pre - guideline versus follow- up $X^2 = 14.5$ post - guideline versus follow- up					P value <0.001**

Table (3): points out that there are a highly statistically significance improvements of mothers' knowledge post- immediately and at follow up guidelines implementation as regards all knowledge items about Brachial Plexus Injuries in neonates and young children.

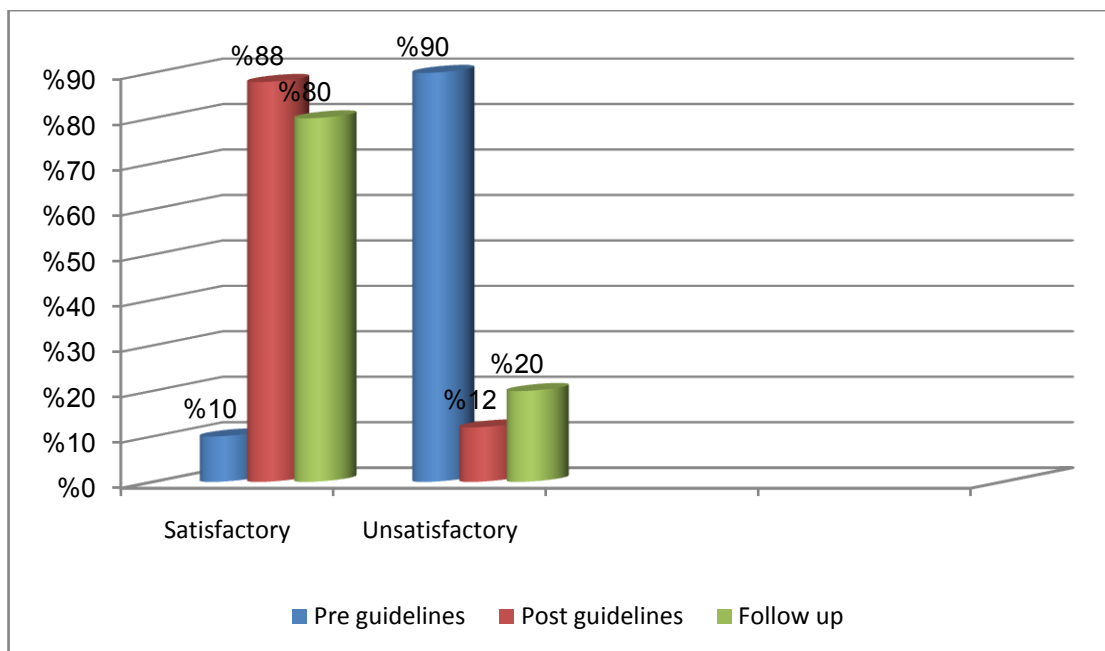


Figure (3): Percentage Distribution of Total Knowledge Score of the Studied Mothers about Brachial Plexus Injuries of their Neonates and Young Children throughout the Guideline Phases (n = 100).

Figure (3) describes the studied mothers' total knowledge score. The majority of them (90%) had unsatisfactory level before the guideline implementation, which improved for most of them (88%) had a satisfactory knowledge immediately post guideline implementation. However, the same figure illustrates that, the majority of studied mothers (80%) had a satisfactory level in their total knowledge scores in follow up phase of guideline implementation, with a highly statistically significant difference ($P < .0001$).

Table (4): Percentage Distribution of Studied mothers According to Their Practices about Brachial Plexus Injuries of their Neonates and Young Children Throughout the Guideline Phases (n = 100).

Practice related to Brachial Plexus Injuries in children	Pre- guideline		Post- guideline		Follow up	
	Competent %	Incompetent %	Competent %	Incompetent %	Competent %	Incompetent %
Massage with warm water and handing support (sensory stimulation)	12.0	88.0	80.0	20.0	87.0	22.0
Splint or Elbow restraining positioning and repositioning	11.0	89.0	75.0	25.0	75.0	25.0
Passive range of motion Stretching exercise with music	75.0	25.0	96.0	4.0	96.0	4.0
Active range of motion Stretching exercise with music	15.0	85.0	90.0	10.0	85.0	15.0
Play activities and feeding methods	8.0	92.0	85.0	15.0	82.0	18.0
Skin care during splint	28.0	72.0	94.0	6.0	92.0	8.0
T-test	$X^2 = 25.8$ pre- guideline versus post- guideline					P value <0.001**
P value	$X^2 = 42.5$ pre - guideline versus follow- up					
	$X^2 = 21.5$ post - guideline versus follow- up					

Table (4): points out that there are a highly statistically significance improvements of mothers 'practice post- immediately and at follow up guidelines implementation as regards all knowledge items about Brachial Plexus Injuries in neonates and young children.

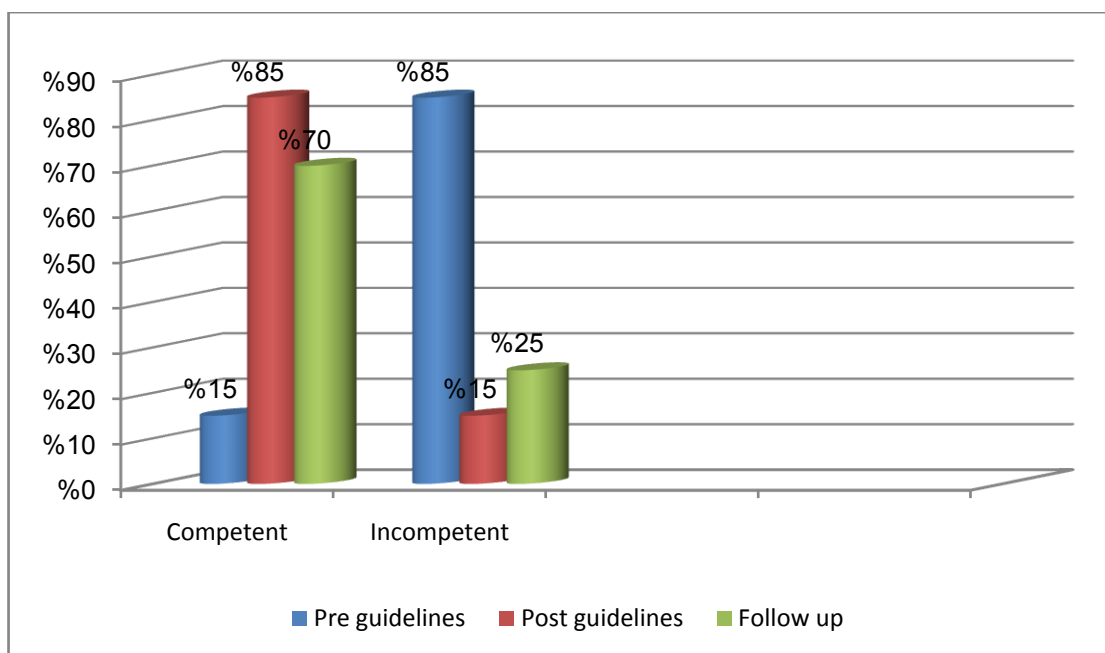


Figure (4): Percentage Distribution of Total Practices Score of the Studied Mothers about Brachial Plexus Injuries of their Neonates and Young Children throughout the Guideline Phases (n = 100).

Figure (4) illustrates that, as regards the studied mothers' total practices score, most of the studied mothers (85%) had incompetent level before the guideline implementation, which improved for most of them (85%) to have competent practices immediately post guideline implementation. Furthermore, the same figure shows that, majority of studied mothers (85%) had competent level in their total scores of practices in the follow up phase of guideline implementation with a highly statistically significant difference ($P < .0001$).

Table (5): Correlation coefficient between mothers' total knowledge/practices regarding educational guidelines implementation (pre, post & follow-up) characteristics and nurses' demographic (N=80).

Variables		Age		Educational qualification		Residence		Occupation	
		R	P	R	P	r	P	R	P
Knowledge	Pre program	0.72	>0.05	0.248	0.001	0.40	>0.05	0.70	>0.05
	Post program	0.544	0.001	0.145	>0.05	0.142	>0.05	0.041	>0.05
	Follow up	0.451	0.001	0.364	0.001	0.72	>0.05	0.152	>0.05
Practices	Pre program	0.22	>0.05	0.42	>0.05	0.21	>0.05	0.031	>0.05
	Post program	0.433	0.001	0.405	0.001	0.64	>0.05	0.130	>0.05
	Follow up	0.232	0.001	0.224	0.001	0.25	>0.05	0.52	>0.05

* Statistically insignificant ($p > 0.05$)

** Highly statistical significant correlation ($P < 0.001$)

Table (5) shows a statistically significant positive correlation between knowledge scores and mothers' age and educational qualification at the pre- and follows up guideline's intervention phase ($P < 0.001$). However, this table shows that there are statistically insignificant correlations between practice scores and mother's age and educational qualification at pre and follow up and immediately after guidelines intervention phases.

V. Discussion

Brachial plexus is an important cause of disability in children, which affect children physical function, self-image, and general wellbeing. Therefore, the aim of the present study was to evaluate effect of educational guidelines program on mothers' knowledge and practice regarding neonates and young children with brachial plexus injuries.

The present study revealed that most children were female. This result agrees with (Abuaraba, 2016). Regarding birthweight the majority of infant have weight more than 3500g. This result was in the same line with (Louden, et al, 2018). Nevertheless, this finding disagrees with (Alosh, 2014) who illustrated in his study that, half of studied sample were macrosomia, and half were non-macrosomia. This meant that, there's no significant association between macrosomia and brachial plexus in his study.

As regard mode of delivery, the majority of cases were normal delivery. This result agrees with **(The American College of Obstetricians and Gynecologists, 2014)**, & **(Bukhari, et al, 2016)**. Mothers' age ranged between 25 < 30 years with mean age **28.68±4.33** years. Similarly, **(Alosh, 2014)** who found that, the mean maternal age for both cases and control in his study sample was 32 years old and the majority of the cases were young mother. This younger age prevalence was due to early marriage. Early marriage occurs due to poor economic situation for some families that mainly prevent females from continuing their education and lead them to get married early. This supported by the finding of the current study showed the more the three quarter of the study sample had illiterate & primary and secondary & technical institute. In addition, there's wrong cultural beliefs and traditions in some areas rural areas that suppose girls to get married early or they will be considered as spinsters if they reach the age of 20 without getting married.

In relation to mothers' knowledge regarding brachial palsy the result of the present study revealed poor mothers' knowledge before program guidelines implementation. This supported by **(Abuaraba, 2016)**. The study done by **(Hamzat, et al, 2008)**. Illustrated that lack of mothers' knowledge regarding children management can hinder treatment and intervention. Similarly, **(Smith, et al, 2015)**. Stated that previous studies mothers of children with brachial plexus describe lack of knowledge provided by health care team. The study conducted by **(Fawcett 2013)**. Emphasized that important knowledge that mother needed includes knowledge regarding treatment and caring with children. Meanwhile, **(Alosh, 2014)** who stressed that brachial palsy is one of the serious problems that presents in each community and can be avoided and increase prognosis and prevent complications by appropriate awareness and good knowledge of the mothers, community and professional experience of the health services providers.

Mothers' of neonates with brachial plexus injury (NBPI) need to have support and guided in caring for their children, also early intervention improve quality of care outcome. Improving mothers' knowledge was the major goal of present study that help to gain more experience and more support **(Squitieri, et al, 2013)**. & **(Kieckhefer, et al, 2014)**. In addition, these neonates require more care and direct supervision than normal neonates so, mothers require adequate experience in dealing with that cases **(Firat et al., 2012)**.

As regard total knowledge score of the studied mothers about brachial plexus injury the majority of them had unsatisfactory level before the guideline implementation. This result supported by **(Hays & Rozental, 2013)**. However, there was satisfactory knowledge immediately post and follow up phase of guideline implementation. This finding agreed with **(Abuaraba, 2016)**. Moreover, **(Alosh, 2014)** who stated that three quarter of the studied sample neonates had good improvement from Erb's palsy after rehabilitation for at least 4 months after delivery. From the researcher point of view improving mothers' knowledge regarding caring of their children with brachial plexus was the main aim of the study and this improve reported in this study indicated the research hypothesis regarding knowledge was achieved.

Regards source of information about brachial plexus injuries, this study result revealed that, health care team and friends were the source of information for less than three-quarters of studied sample (Fig. 2). This may be due to that many mothers are ignore and shy about who asking for details resulting from closed communities. This result supported by **(Myrold and Wagner, 2015)** who found limited resources of information for caregivers of young children with disabilities, especially for infants with NBPP. This manual fills this gap by helping as a holistic resource for caregivers to use in order to achieve a high quality of life for both themselves and their infant. so, for this reason, it is important to approach the subject, so that health education programs and guidelines could bring significant improvement in their knowledge and practice about brachial plexus injuries problems, so communication with mothers is a necessary factor in solving NBPI demands.

In relation to mothers' practice the result of the present study showed there are highly statistically significance improvements with in mothers 'practice post- immediately and at follow up guidelines implementation. **(Vaz et al. 2010)**, stated that providing mothers with experience in caring with their infant in daily activities improving quality of life. Children with brachial are dependent on mothers to assist and caring in their daily activities therefore, the importance of improving mothers' practice provide them with experience regarding caring with their children. Additionally the study conducted by **(Abdel-Kafy, et al, 2013)**. Reported that mothers were supplied with skills activities they would typically practice by fitting them into their daily routine that help improve function of the affected extremity while maintaining the infant's well-being.

Mothers play an active role in helping their children and caring with them effectively. Wherever, training mothers about Practice related to brachial plexus as stretching and strengthening activities during therapy sessions, and developed an individual home-exercise program, designed to maintain strength and range of motion exercise. Mothers taught how to gently do the exercises and encouraged to make them daily. Additionally, normal developmental activities explained to mothers and helped them to perform arm and hand activities twice per week **(National Institute of Neurological Disorders and Stroke, 2014)**.

The essential of providing mothers of newborn with an evidence-based educational program to teach essential skills of newborn and clarify that brachial plexus was one of mentioned issues. An evidence-based

practice intervention program aiming to improve mothers' knowledge and practice and children outcomes (Crofts, et al, 2006). & (Siassakos, et al, 2011).

From the researcher point of view mothers' perception and awareness of practice related to brachial plexus injury as range of motion, and passive handling enhance better interaction with mothers and their children and provide mother with confidence about effective care providing.

As regard to the correlation between total knowledge of mothers and their personal characteristics, the current result revealed that there was a statistically significant positive correlation between total knowledge of mothers with their age, and educational qualification at the pre- and follow up guideline's intervention phase. This finding is consistent with (Al-Ayed, 2010) who conducted a study to assess the level of mothers' knowledge on certain aspects of child health care and demonstrated that positive correlation between mothers' level of education and knowledge, and practice providing to child through care. In addition (Abuaraba, 2016). Illustrated that educational levels of mothers linked to the lack of knowledge of the mothers related to brachial plexus. In addition, the majority of mothers were satisfied with their knowledge provided to them.

The researcher point of view suggested that mothers should be aware of knowledge and practice requiring caring for their children with brachial plexus injuries because child care was the first responsibility of mothers. This further support the study hypothesis. Augmenting the results of current study, it evident that education and training courses has a vital role in improving mothers' knowledge and practice toward brachial plexus injuries education. Moreover, the result of the present study revealed that mothers' knowledge and practice were improved after program implementation. This could attribute to the fact that the importance and effectiveness of training course in enhancing mothers' knowledge and practice which play significant role in the quality of care providing and effective outcomes.

VI. Conclusion

Based on the results of the present study, it can be concluded that, there were highly statistically significance improvements with in mothers' knowledge and practice post- immediately and at follow up guidelines implementation. Moreover, there were a significant positive correlation between mothers' knowledge and practice age and level of education at pre and follow up and immediately after guidelines intervention phases.

VII. Recommendation

In the light of the findings of the current research, the following recommendations are suggested:

1. Provide continuous education and training for mothers regarding brachial plexus in children.
2. Early intervention to avoid further complication and handicaps.
3. Further study can be replicated on other hospitals using a large sample size to clinically verify the effectiveness of the educational guidelines and generalize the results of the study.

References

- [1]. Abdel-Kafy, E. M., Kamal, H. M., & Elshemy, S. A. (2013). Effect of modified constraint induced movement therapy on improving arm function in children with obstetric brachial plexus injury. *The Egyptian Journal of Medical Human Genetics*, 14(3), 299-305. doi:10.1016/j.ejmhg.2012.11.006
- [2]. Abdullah E. Kattan and Gregory H. Borschel (2014). *Anatomy of the brachial plexus Division of Plastic Surgery*, The Hospital for Sick Children, and University of Toronto, Toronto, Ontario, Canada 1874-5393/11/\$27.50 © 201 I -IOS Press and 'the authors. All rights reserved.
- [3]. Abuaraba, K., (2016). Profile of Caregiver Experiences of Infants with Obstetric Erb's Palsy Treated at A tertiary Institution. A thesis submitted in partial fulfilment of the requirements for a master's degree in Physiotherapy in the Department of Physiotherapy, Faculty of Community and Health Sciences, University of the Western Cape. 1-13.
- [4]. Akel, B. S., Öksüz, Ç., Oskay, D., Firat, T., Tarakçı, E., & Leblebicioğlu, G. (2013). Health-related quality of life in children with obstetrical brachial plexus
- [5]. Al-Ayed, I., H. (2010). Mothers' knowledge of child health matters: Are we doing enough? *Journal Family Community Med*, 2010 Jan-Apr; 17(1): 22-28.
- [6]. Alos, L., O., (2014). Erb's Palsy In Jenin District Prevalence And Risk Factors. This Thesis Is Submitted In Partial Fulfillment Of The Requirement Of The Degree Of Master Of Public Health, Faculty Of Graduate Studies, An- Najah National University, Nablus, Palestine, 40-52.
- [7]. Bukhari, A., Bajouh, O., Bresali, D., Roblah, A., Alghaffi, Z., Khawjah, D., Alhawsa, B. (2016). Incidence of shoulder dystocia and its relation to brachial plexus palsy: a 10-year retrospective review at King Abdulaziz University Hospital. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology Bukhari AA et al. Int J Reprod Contracept Obstet Gynecol*. 2016 Dec; 5(12):4415-4418
- [8]. Coroneos, C. J., Voineskos, S. H., Christakis, M. K., Thoma, A., Bain, J. R., Brouwers, M. C., (2016). Obstetrical brachial plexus injury (OBPI): Canada's national clinical practice guideline on behalf of The Canadian OBPI Working. *BMJ Open* 2017; 7:e014141. doi:10.1136/bmjopen-2016-014141.
- [9]. Crofts J.F., Bartlett C., Ellis D., Hunt L.P., Fox R., & Draycott T. J., (2006). Training for shoulder dystocia: a trial of simulation using low-fidelity and high-fidelity mannequins. *Obstet Gynecol* 2006; 108(6):1477-85.
- [10]. Fawcett, A. L. (2013). Principles of assessment and outcome measurement for occupational therapists and physiotherapists: theory, skills and application. John Wiley & Sons.

- [11]. Firat, T., Oskay, D., Akel, B. S., &Öksüz, Ç. (2012). Impact of obstetrical brachial plexus injury on parents. *Pediatrics International*, 54(6), 881-884. doi:10.1111/j.1442-200X.2012.03734.x
- [12]. Hamzata, T., Carsamerb, S., &Wireduc, E. (2008). Prevalence of newborn brachial plexus palsy in Accra, Ghana. *Journal of Pediatric Neurology* 6 (2008) 133–138 IOS Press
- [13]. Harrison C. (2009). Brachial plexus injuries: What parents need to know? *Pediatrics for Parents*, 25(11/12), 26-27.
- [14]. Hays, P. L. and Rozenal, T. D. (2013). Rehabilitative strategies following hand fractures. *Hand clinics*, 29(4), 585-600.
- [15]. IffyL., (2015). Prevention of Brachial Plexus Injuries at Birth. *J Gynecol Res Obstet*, 1(1): 001-005. DOI: <http://dx.doi.org/10.17352/jgro.000001>.
- [16]. Kieckhefer G.M., Trahms C.M.,& Churchill S.S., et al. (2014). A randomized clinical trial of the building on family strengths program: an education program for parents of children with chronic health conditions. *Matern Child Health J*. 2014;18:563–574. [PubMed]
- [17]. Louden E., Marcotte M., Mehlman C., Lippert W., Huang B., & Paulson A.,(2018). Risk Factors for Brachial Plexus Birth Injury. *Children (Basel)*. 2018 Apr; 5(4): 46. US National Library of Medicine. National Institutes of Health.
- [18]. Meghan G. H.& Wayne R C.(2016). Shoulder dystocia: prediction and Management University of Arizona College of Medicine, Tuscon, AZ 85724, USA. *Womens Health* (2016) 12(2), 251–261 ISSN 1745-5057 251 part of Review.
- [19]. Memo, L., Caminiti, S., Memo, A., Garozzo, D., &Ferraresi, S. (2013). Obstetrical brachial plexus injury. *Early Human Development*, 89(SUPPL4), S82-S84.
- [20]. Ming, Z., Dong, G., Jun, X., Yu, Z. & Xin, Z. (2012). Clinical research of comprehensive
- [21]. Myrold, M., and Wagner, T., (2015). "A Manual for Caregivers of Infants with Brachial Plexus Injuries" *Occupational Therapy*. Capstones. 144. <https://commons.und.edu/ot-grad/144>.
- [22]. National Institute of Neurological Disorders and Stroke. (2014). Information page on brachial palsy birth injuries. National Institute of Health's website. Accessed November 12, 2014. *Quality of Life Research*, 22(9), 2617-2624.
- [23]. Pondaag, W., Allen, R. &Malessy, M. (2011). Correlating birth weight with neurological severity of obstetric brachial plexus lesions. *BJOG: An International Journal of Obstetrics andGynaecology*,118, 1098-1103.
- [24]. Raducha, J. E., Cohen,B., Blood,T., &Katarincic, J.,(2017). A Review of Brachial Plexus Birth Palsy: Injury and Rehabilitation. *Pediatric Rehabilitation Medicine (Prm) NovembEr 2 0 1 7 Rhode I Sland Medi Cal Journal*, rehabilitation in treating brachial plexus palsy injury patients. *Journal Chinese Medicine*
- [25]. Siassakos D., Fox R., Crofts J.F., Hunt L.P., Winter C., &Draycott T. J., (2011). The management of a simulated emergency: better teamwork, better performance. *Resuscitation* 2011;82(2):203-06.
- [26]. Smania N., Berto G., LA Marchina E., MelottiC., MidiriA., Roncari L.Zenorini A., IanesP., Picelli A., Waldner A., Faccioli S.,& Gandolfi M. (2012). Rehabilitation of brachial plexus injuries in adults and children. *European Journal of Physical and Rehabilitation Medicine EUR J PHYS REHABIL MED*. 2012; 48:483-506.
- [27]. Squitieri L., Larson B.P., & Chang K.W., (2013). Understanding quality of life and patient expectations among adolescents with neonatal brachial plexus palsy: a qualitative and quantitative pilot study. *J Hand Surg Am*, 2013;38:2387–2397 e2382. [PMC free article][PubMed]
- [28]. Smith, J., Cheater, F. &Bekker, H. (2015). Parents' experiences of living with a child with a long-term condition: a rapid structured review of the literature. *Health Expectations*, 18(4), 452- 474.
- [29]. The American College of Obstetricians and Gynecologists. (2014).*Neonatal Brachial Plexus Palsy* Washington DC: ACOG; 2014
- [30]. Vaz, D. V., Mancini, M. C., do Amaral, M. F., Brandao, M. B., Drummond, A. F., & da Fonseca, S. T. (2010). Clinical changes during an intervention based on constraint-induced movement therapy principles on use of the affected arm of a 188 child with obstetric brachial plexus injury: A case report. *Occupational Therapy International*, 17(4), 159-167. doi:10.1002/oti.295
- [31]. WilliamsS., (2005).Standard of care for use of restraints in CCTCUpdated: November 5, 2018 (BM).

Sahar SedkyFaheim. " Effect of Educational Guideline on mothers' Knowledge and Practice regarding neonates and Young Children with Brachial Plexus Injuries" .IOSR Journal of Nursing and Health Science (IOSR-JNHS), vol. 8, no.04 , 2019, pp. 55-66.